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ABSTRACT

This document describes domains to be covered by the Work Sampling Assessment of the Delaware Student Testing Program's Kindergarten and First Grade assessment. It contains guidelines to the skills children should demonstrate at these grades. It also describes indicators of these skills in terms of specific achievements. For Kindergarten, the first domain, "Personal and Social Development," has a dual focus in that it refers to children's feelings about themselves and their social development and interpersonal skills. The "English Language Arts" domain organizes the language and literacy skills needed to understand and convey meaning into four components: listening, speaking, reading, and writing. The focus of the mathematics domain is on children's approaches to mathematical thinking and problem solving. The same three domains are described for first grade, differing from the kindergarten guidelines by their increased developmental complexity. (SLD)

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Delaware Department of Education

Delaware Student Testing Program

Work Sampling Assessment

Kindergarten and First Grade Developmental Guidelines

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The Work Sampling System.

REBUS INC., a Pearson Education, Inc. Company
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For more information about
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I Personal and Social Development

This domain has a dual focus. First, it refers to children's feelings about themselves. The teacher can learn about these feelings by observing children, listening to their comments, and hearing families talk about their children. Included in this focus are indicators that refer to children's views of themselves as learners, and their sense of responsibility to themselves and others. The second focus concerns their social development, including children's interactions with peers, adults, and family members. Particularly important are the skills children show they are acquiring while making friends, solving conflicts, and functioning effectively in groups.

A Self-concept

1 Shows comfort and confidence with self.

Self-awareness and positive self image grow through interactions with others and through experiences of being effective. Kindergartners display a positive sense of self by:

- entering established groups confident they will be accepted;
- suggesting roles for themselves in dramatic play or blocks;
- coping well with personal awkwardness or mistakes when trying new tasks;
- entering the classroom in the morning with the assurance they are expected and accepted;
- enjoying the creative process and expecting that their accomplishments will be appreciated by others;
- explaining their disabilities and coping strategies to able-bodied children.

2 Shows initiative and self-direction in actions.

Independence in thinking and action enables children to be creative and take responsibility for their lives. Children often need help from adults as they begin to expand their independence. Some examples of independence are:

- originating projects and working on them without extensive direction from the teacher;
- finding materials for projects, such as scissors and tape to build a house out of a cardboard box;
- finding their outdoor clothes and dressing without extensive teacher supervision;
- assuming classroom chores without being asked (for example, sweeping sand from the floor, watering the plants, helping to clean up spilled juice);
- knowing how and where to stack blocks at clean-up time.

B Self-control

1 Follows classroom rules and routines.

Children who are successful within a group know and accept the rules established for that particular group. Children who are learning this skill can be quite dogmatic with their peers, insisting on adherence to the rules. They are comfortable when they know the routines and can plan their activities around the daily schedule. Ways that children show this ability are:

- knowing that only three people can be at the work bench at one time and choosing another activity until space is available;
- recognizing that because it is almost time for snack, there isn't enough time to take out a new toy or build something new;
- waiting until everyone is dressed before going out on

the playground;

• putting away the puzzle before starting another activity, or shutting off the tape player before leaving the listening center.

2 **Uses classroom materials purposefully and respectfully.**

One of the major challenges of school for five year olds is learning how to care for classroom materials. In school, a child learns how to use materials thoughtfully so that they continue to be available for others, and how to put things away so that others can easily find them. Examples include:

• using materials and equipment without breaking or destroying them;

• using materials with intention, such as playing the piano with a song in mind, not just pounding;

• hanging dress-up clothes on their proper hooks;

• using scissors appropriately for cutting, and then putting them back in their assigned place;

• keeping the sand inside the sand table;

• taking out the building blocks to create a structure rather than just emptying the shelves.

3 **Manages transitions and adapts to changes in routine.**

Adapting to or accepting changes in routine is often difficult to learn. However, change is very much a part of growth. Kindergartners are beginning to adjust to changes and learn that different situations call for different behaviors. Children show this flexibility by:

• moving smoothly from one routine to another (for example, from activity period to clean-up, or from story time to getting ready to go home);

• moving from home to school without extensive or long-lasting anxiety;

• greeting visitors who come into the classroom and then continuing with work;

• remembering to whisper when visiting the library.

C Approach to learning

1 **Shows eagerness and curiosity as a learner.**

Kindergartners are active learners and are curious and excited about their environment. They demonstrate curiosity in their play and can become very insistent when they have strong ideas. Examples include:

• being excited and curious about new things in the classroom, such as a collection of fall leaves or shells from the sea shore;

• asking meaningful and appropriate questions;

• showing interest in stories and events related by other children;

• looking at a picture of a castle and trying to build it with blocks.

2 **Chooses new as well as a variety of familiar classroom activities.**

Although some children this age repeatedly choose familiar activities and are hesitant to venture into new areas, others are very willing to try new experiences, or to take risks. Examples of making independent choices include:

• selecting new activities during choice time, such as trying the carpentry table or the computer for the first time;

• showing excitement about new opportunities and experiences presented in the classroom (such as a new floor puzzle the teacher introduced during group discussion);

• choosing to play or work on a project because the activity interests them, rather than because friends are doing it.

3 **Approaches tasks with flexibility and inventiveness.**

Kindergartners often need help and encouragement when trying different ways of accomplishing a task. Many children are reluctant to try new ideas because if they do not succeed the result is often interpreted negatively by themselves or adults. Trial and error nurtures and encourages creativity. After children have tried unsuccessfully to solve problems it is important for them to know when and where to get help. Some examples of flexibility and risk taking include:

• attempting several different ways to solve a problem (for example, trying to build a roof over a structure with different types of blocks);

• attempting several ways of folding or cutting paper to make a kite or airplane;

• communicating frustration in an acceptable way after failing to accomplish a task;

• creating something new (for example, a pretend camera) by combining several familiar materials (for example, a milk carton and tape).

4 **Sustains attention to a task over a period of time, even after encountering problems.**

Kindergartners often become frustrated when tasks require skills that are beyond their abilities. They may need encouragement to keep trying and to develop persistence. They may also need support to understand that making mistakes or failing the first few times are important parts of learning and gaining skills. Some examples include:

• making several attempts at solving a problem (for example, assembling a new puzzle, or gluing together a three-dimensional collage);

• remembering on a day-to-day basis to maintain long-term projects (such as watering seeds regularly, recording corn plant growth on a chart daily, reading the thermometer and recording temperatures regularly);

• continuing projects from one day to the next, such as working on a clay sculpture for several days.

D Interaction with others

1 **Interacts easily with one or more children when playing or working cooperatively.**

Kindergarten children are beginning to learn how to play cooperatively with one or more children, listen to peers, and arrive at solutions in a cooperative manner. Some five year olds still find it difficult to interact with peers they do not know very well. These children often need teacher encouragement to try activities with a new group of children. Evidence that children are developing these skills includes:

• following suggestions given by a friend about how to proceed in their play (for example, deciding to build a fire station with the large hollow blocks, in response to a friend's suggestion);

• giving assistance to peers who are trying to solve a problem (helping to zip coats or tie shoes, or figuring out how to divide the Legos among three children);

• choosing to work with new children;

• helping a friend set the snack table with napkins and cups.

2 **Interacts easily with familiar adults.**

I Personal and Social Development

Many kindergarten children are more comfortable talking and interacting with adults than with their peers. Feeling at ease with adults includes:

- greeting the teacher or other adults when arriving in the morning;
- relating events and anecdotes to the teacher with ease and comfort;
- interacting easily with other adults in the school, such as the custodian, the lunch room monitor, or the crossing guard.

3 Participates in the group life of the class.

Kindergartners are fairly adept at following group expectations if they have had previous school experience. They are very interested in the meaning of friendship: "What does having a friend mean?", "how does friendship work?" This interest helps them become involved in the group because they want to be with their friends. They are also anxious to establish order in their lives and prefer consistent routines. This "order" gives them a sense of control. Kindergarten children show their understanding of group life by:

- taking part in group activities, such as circle, music, or story time;
- showing knowledge of class routines (for example, that snack comes after cleanup, and quiet reading time after snack);
- remembering to wash hands before a cooking project;
- putting toys and manipulatives away in their proper places when finished, before going on to a new activity;
- helping a friend find a lost toy;
- listening to a discussion and participating in developing an idea or plan.

4 Participates and follows rules in group activities.

Winning is not usually as important to kindergartners as using and learning the skills involved in playing a game. They are more concerned with how well they can play rather than being the best. Kindergarten children show the ability to play cooperatively by:

- participating in simple, noncompetitive games, like The Hokey Pokey;
- waiting for turns;
- adapting to and playing cooperatively in situations where the rules are established at the beginning of play;
- playing simple card games like Go Fish or Concentration;
- playing listening and guessing games like I Spy;
- joining a small group going to the library;
- being a part of the audience as well as an active participant in group events.

5 Shows empathy and caring for others.

Some children naturally express care and understanding for others' feelings. Other children need guidance and support from teachers to acquire these qualities. Children show empathy and understanding by:

- displaying sadness along with a friend whose pet has died;
- being concerned and wanting to help when a classmate falls and hurts her/himself;
- showing concern for a friend who has been excluded from a game or dramatic play;
- trying to help when a classmate's block structure has fallen;

- helping a classmate pick up spilled crayons;
- carrying something for a child who is unable to do so.

E Social problem-solving

1 Seeks adult help and begins to use simple strategies to resolve conflicts.

An initial step in conflict resolution is recognizing when there is a conflict and getting help to solve it. Communicating and using varied strategies to resolve conflicts (for example, "fair trades" or taking turns by mutual agreement) are emerging skills for kindergartners. They still need adult support and modeling to use words to solve problems, suggest possible solutions, and participate in compromise. Children show they are learning these skills by:

- asking for help when a second child wants to use the same blocks;
- asking the teacher to set the timer so each person will know how long he or she can use the computer;
- negotiating with another child to divide the markers and determine how many each will use;
- settling a dispute with another child through negotiation, addressing their own rights as well as accommodating the other child's needs (for example, "I'll use the paste for these two pieces of paper and then give it to you");
- using words suggested by an adult to settle conflicts;
- taking turns without pushing or other physical conflict;
- sharing without grabbing;
- using words to express feelings, such as, "I don't like it when you push me";
- using and accepting compromise when intruded upon (for example, when a new child wants to enter a game already underway, making room for him or her during an appropriate break).

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II English Language Arts

This domain organizes the language and literacy skills needed to understand and convey meaning into four components: Listening, Speaking, Reading, and Writing. Students acquire proficiency in this domain through extensive experience with language, print, and literature in a variety of contexts. Over time students learn to construct meaning, make connections to their own lives, and gradually begin to critically analyze and interpret what they hear, observe, and read. They begin to communicate effectively orally and in writing for different audiences and purposes.

A Listening

1 Gains meaning by listening.

(Content Standards II, III, and IV)

Young children are actively involved in learning about their world by watching and listening. Kindergartners can listen for meaning in such different situations as one-on-one conversations with children or adults, small and large group activities, story times, and videos. They demonstrate their attentiveness through body language, eye contact, and active participation. They show their understanding by asking questions, making comments relevant to the topic, and reacting appropriately to what is heard. Examples include:

- showing understanding through body language (leaning forward), facial expressions (a frown or a smile), adding a related thought, or asking a relevant question;
- using knowledge gained from listening to solve a problem, to make a personal decision, to understand a social issue, to retell the story or restate the message, or to create a product;
- responding to stories by making inferences about the content, events, characters, or setting;
- listening to text read aloud and connecting own experiences to the content (characters, events).

2 Follows directions that involve a series of actions.

(Content Standards II, III, and IV)

Kindergartners can follow one-to-three-step directions immediately after they hear them, but sometimes forget instructions over time or become distracted before they can complete a longer series of actions. The ability to focus and remember is important for school success. Children show this ability by:

- following one-step, two-step, and three-step directions without reminders to complete a task;
- retelling a set of instructions.

3 Demonstrates beginning phonemic awareness.

(Content Standard II)

Phonemic awareness refers to the ability to hear and pay attention to how words sound. In order for children to become fluent readers, they must be able to hear the smallest units of sound within words (phonemes) and to focus on these sounds separate from the meaning of the word. With frequent demonstrations by the teacher, children recognize and produce rhyming words, identify beginning and ending sounds, and begin to discriminate the smallest parts of words, first distinguishing syllables and later phonemes within syllables. Ways children demonstrate this awareness are by:

- identifying and/or producing words that have the same beginning sounds;
- identifying and/or producing words that rhyme with one another or words that share beginning or ending sounds;
- blending sounds to make new words or syllables;
- clapping words into syllables;
- clapping beats of their name.

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B Speaking

1 Speaks clearly and conveys ideas effectively.

(Content Standard I)

Kindergartners' speech is easily understood by listeners. During kindergarten, children begin to understand how to express their ideas coherently in group discussions as well as in one-to-one conversation. They speak loudly enough to be heard by listeners. Their sentences become longer and more complex as their language becomes richer and more detailed. Examples include:

- retelling events or relaying messages in more than short phrases, using appropriate volume, tone, speed, and enunciation;
- telling a story or message in an organized way including all relevant information;
- initiating conversations and asking questions in sentence form rather than with a few words or phrases;
- beginning to follow rules for conversations (taking turns and staying on topic).

2 Uses expanded vocabulary and language for a variety of purposes and audiences.

(Content Standard I)

During kindergarten, children's expanding vocabularies provide them with a larger knowledge base that will assist them as they begin to read. They are acquiring words to name or describe many things, and they are refining their social use of language. Kindergartners will use language for many purposes including:

- using new vocabulary words in sentences;
- asking questions about words they do not understand;
- using oral language to persuade, inform, and express.

C Reading

1 Shows interest in books and reading-related activities.

(Content Standards II, III, and IV)

Children enter school with varying levels of experience with and interest in books and reading. Through repeated exposure to literature, kindergarten children can be expected to understand that authors write books, illustrators draw pictures, and books convey information or stories. Kindergartners can listen attentively to stories and develop preferences for books by certain authors or topics of special interest. Children show this interest by:

- requesting that favorite stories, as well as new and different books, be read;
- looking at books during reading time;
- pretending to read a book using pictures or memory as clues;
- listening to a story on tape while following along in the accompanying book.

2 Shows some understanding of concepts of print.

(Content Standard II)

Kindergartners are beginning to understand how print is organized and read. They realize that print conveys meaning, spoken language can be written down and read, and certain words are always written the same way. They begin to notice spaces between words, distinguish letters from drawing and numerals, recognize different types of text, recognize the parts of a book, and begin to track print from left to right and top to bottom, pointing to the words as they read. Other examples include:

- holding print materials in the correct position;
- locating the front cover, back cover, and title page of a book;
- following words from left to right, top to bottom, and return sweep on a printed page;
- distinguishing letters, words, and sentences;
- identifying upper- and lowercase letters of the alphabet;
- describing what authors and illustrators do;
- matching voice with print through associating words and phrases with their written forms.

3 Knows letters, sounds, and their relationships.

(Content Standard II)

By the end of kindergarten, children acquire knowledge about the systematic relationship between letters and sounds. They understand that a group of letters represents a sequence of sounds that combine to form a word (the alphabetic principle). Kindergartners can identify and name upper- and lower-case letters, understand that letters stand for sounds, and associate the correct sound with many letters. They begin to sound out words and can develop a limited sight vocabulary. Ways that children show this ability include:

- recognizing and naming upper- and lower-case letters;
- exhibiting letter/sound associations in consonants;
- recognizing familiar words, including own name and common signs and logos in the environment.

4 Comprehends and responds to fiction and non-fiction text.

(Content Standards II, III, and IV)

Kindergartners expand their vocabulary and general background knowledge as they listen to fiction and non-fiction texts read aloud. They demonstrate their understanding of what they hear by answering questions about the text, predicting what will happen next using pictures and content for guides, and retelling information from a story in sequence, adding more details and story elements over time. After children comprehend a text, they begin to relate their own experiences to what they have read. Examples include:

- looking at pictures and predicting what will happen next;
- retelling stories using beginning, middle, and end;
- identifying author's purpose;
- restating information from an informative text;
- explaining a character's actions;
- asking and/or answering questions after listening, viewing, or reading;
- relating content of story to personal experience;
- beginning to differentiate between real and make-believe;
- identifying story elements (characters, setting, beginning/middle/end);
- organizing textual information (KWL, web, graph), with teacher assistance;
- recognizing the feelings of characters;
- relating incidents in text or media to experiences.

D Writing

1 Represents stories through pictures, dictation, and play.

(Content Standard I)

Before kindergartners use conventional forms of writing, they willingly describe their drawings, use drawing to tell stories with a beginning, middle, and end, and represent stories as they play. They can focus on an idea for a story and make a simple plan for expressing it. Children demonstrate this ability by:

- reading and explaining their own writing and drawings;
- dictating stories;
- drawing a picture of an event or character in a story;
- telling a story through role playing.

2 Understands purposes for writing.

(Content Standard I)

Children begin to understand the importance of writing when they see that messages are meaningful. Over time, they recognize that people write for different purposes, using different forms of writing (stories, signs, letters, lists). Examples include:

- realizing that print carries meaning (picture captions, classroom signs);
- copying words to convey messages (stop/go, in/out, open/closed);
- using print to express (story, letter, label), persuade (letter, sign), and inform (report, list, recipe, sign, label).

3 Uses letter-like shapes, symbols, letters, and words to convey meaning.

(Content Standard I)

As children begin to understand that writing communicates their thoughts to someone else, they become motivated to produce words, even before they are writing conventionally. They often begin by using drawings, scribbles, and random letters to convey ideas. After experimenting, children learn to write most upper- and lower- case letters. They begin to form words by using the letters from their names, copying words from books or bulletin boards, approaching the teacher or another child for help, sounding out words using letter-sound associations, and using invented or temporary spelling. Across the kindergarten year, kindergartners use various writing forms (drawing, scribbling, invented spelling) to write their messages, such as:

- printing name on artwork or to label classroom projects;
- writing labels, notes, and captions for illustrations using drawing, scribbling, and/or invented spelling;
- writing text to match illustrations;
- experimenting with various writing formats (lists, labels, signs, messages);
- composing messages with increasing readability by self and others (from scribbling, to letter forms, to invented spellings).

III Mathematics

The focus in this domain is on children's approaches to mathematical thinking and problem-solving. Emphasis is placed on how students acquire and use strategies to perceive, understand, and solve mathematical problems. Mathematics is about patterns and relationships, and about seeking multiple solutions to problems. In this domain, the content of mathematics (concepts and procedures) is stressed, but the larger context of understanding and application (knowing and doing) is also of great importance.

A Mathematical processes

1 Begins to use and explain strategies to solve mathematical problems.

(Content Standards I, II, III and IV)

Solving real-life problems helps children make connections among the math they are learning at school, other parts of their lives, and other types of learning. Problem-solving involves posing questions, trying different strategies, and explaining one's thinking by stating reasons a particular strategy worked. Young children solve problems and explain their reasoning by working with concrete objects, drawing pictures, or acting out solutions. Examples include:

- saying, "I gave Sammy one of my cookies because I had three and he had one. Now we have the same, two and two!";
- estimating whether there are enough blocks to build a road from here to there, and then testing the guess by building the road;
- solving problems by guessing and checking (for example, guessing number of cubes in a small jar and then counting to check estimate);
- playing computer games that involve problem-solving or beginning mathematical concepts;
- figuring out if there are enough cookies for each child to have one.

2 Uses words and representations to describe mathematical ideas.

(Content Standards I, II, III, and IV)

School provides kindergarten children with many opportunities to communicate mathematical ideas. When teachers ask children to describe how they know the number of crackers needed at the snack table or why they created a particular pattern, they encourage children to attach language to mathematical thinking. Members of this age group represent their thinking by using objects, fingers, drawings, bodies, and occasionally, written numerical symbols. These representations help children retain information and allow children to reflect on their own problem-solving strategies.

Other ways children describe their mathematical thinking include:

- explaining that they chose a puzzle piece because its shape matched the other shape;
- telling a friend or teacher how they built the tallest block structure in the school;
- drawing a picture of a Lego structure they made so they can rebuild it the next day;
- explaining that they put all the long sticks in one box and all the short sticks in another box;
- asking for a bigger container at the sand table because they want to make a larger building or move more sand;
- identifying geometric shapes in the world around them (for example, after a neighborhood walk, commenting that all the windows in the houses were "rectangles");
- using quantity and size words ("more," "less," "larger,"

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"smaller," "wider," "narrower," "thinner," "thicker") as they play during choice time;
- using written numerals to record a count or survey result.

B Numbers and Operations

1 Shows understanding of number and quantity.

(Content Standards V, and VI)

Kindergarten children can count objects to at least 20; many learn to count verbally (that is, by rote) to 100. They can count using one-to-one correspondence reliably, use objects to represent numbers, and use numerals to represent quantities. With maturation and experience, they can begin to understand that a set of objects equals the same number regardless of the position, shape, or order of the objects. They continue to expand their understanding of ordinal numbers (first through tenth) and understand that the last number named in a collection represents not only the last object, but the total number of objects as well. Children demonstrate this understanding by:

- explaining that there are 17 people at the circle today, after counting them aloud with their classmates;
- associating the correct numeral with sets of up to ten objects;
- using number words to show understanding of the common numerical property among nine children, nine cups, nine trucks, and nine blocks;
- continuing counting pennies to ten after a friend stopped at 6 (. . . "7, 8, 9, 10"), thus, making the transition from counting all to counting on;
- adding five red blocks to four blue blocks and noting that there are nine blocks in all;
- counting forwards or backwards from 10 verbally;
- announcing that the number of counting bears hasn't changed, whether the bears are in a line or grouped in a circle or whether they are counted from the left or the right (i.e. conservation of quantity);
- using a calendar to count the number of days until a class trip;
- representing numerals with the correct number of objects;
- recognizing a penny, nickel, dime, and quarter in the dramatic play area;
- naming correctly the second, third, and fourth children in line.

2 Begins to understand relationships between quantities.

(Content Standards V and VI)

As children gain mastery over the use of numbers and how numbers apply to quantity, they begin to explore the relationships of one quantity to another. They can compare two sets with up to 10 objects and use such vocabulary as "more," "less," "equal," or "the same number as" to describe them. They are beginning to understand how quantity changes when they combine sets to make larger ones or decrease the size of sets by removing items. Children show their understanding by:

- investigating different strategies for creating different quantities (for example, by working with red and blue cubes to learn that seven can be made up of two red cubes and five blue cubes or three blue cubes and four red cubes, etc.);
- completing a graph of their family members, and telling the class that there are more girls than boys in their family;
- understanding that a group of objects (up to 10) is smaller after "we take away two objects from the original group";
- counting two groups of blocks, noting whether one group has more, less, or the same number of blocks as the other;
- placing eight blocks in a group, adding two, giving the sum, and explaining that the group is larger than it was before;
- creating groups of 10 objects for each friend at the table.

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C Patterns, relationships, and functions

1 Sorts objects into subgroups, classifying and comparing according to a rule.

(Content Standard X)

Sorting objects into groups according to attributes is an important mathematical skill that requires children to recognize similarities among objects. Although some kindergartners can only perceive one attribute at a time, others are able to integrate several attributes, such as sorting by color and size. Other ways kindergartners show this skill include:

- sorting all the pegs or counting bears into groups by a single attribute such as size (long and short, or big and little) or color;
- sorting through a box of buttons and making up and explaining their own rules of organization (for example, "These are all rough and these are all smooth." or "These have two holes and these have four holes.");
- sorting the buttons by color, and then sorting each color group into big and small;
- sorting through Lotto cards and putting wild animals in one pile and farm animals in another;
- noticing that these pattern blocks have six sides and are yellow, and those blocks have three sides and are red.

2 Recognizes, duplicates, and extends patterns.

(Content Standard X)

Patterns are a critical component of the foundation of mathematical thinking. Kindergartners can recognize, create, copy, and extend simple patterns using concrete objects, sounds, and physical movements. They can describe a pattern, recognize patterns in the environment, and use a pattern to predict what comes next. Many kindergartners can begin to use colors, sounds, and letters to describe an existing pattern (an AABB pattern is the same as a snap-snap-clap-clap pattern). Other examples include:

- seeing the pattern in a string of beads and determining which bead is needed to continue the pattern;
- duplicating a pattern of clapping (for example, two fast claps and a pause, then two slow claps and a pause);
- recognizing and describing a pattern in the classroom environment (for example, in the border around a bulletin board, on a T-shirt, or on wallpaper samples);
- knowing that a /red red green/ red red green/ pattern is the same as a /clap clap snap/ clap clap snap/ pattern;
- creating patterns with a variety of materials, such as Legos, pattern blocks, Cuisenaire rods, and then describing the pattern;
- extending a pattern, for example, patterns on the pocket chart.

D Geometry and spatial sense

1 Recognizes and describes some attributes of shapes.

(Content Standard VIII)

As children play with unit blocks, table blocks, pattern blocks, shape sorters, peg boards, and geoboards, they gain a concrete understanding of shape and form. Kindergartners can identify, describe, label, and create a variety of common two-dimensional shapes and solids (circle, square, triangle, rectangle, cube, sphere) and begin to describe their attributes (corners, curves, edges). This concrete experience is important to later geometrical thinking and problem solving. Children demonstrate this ability by:

- creating (drawing, folding, cutting) models of circles, squares, rectangles, and triangles with varied materials (crayons, a geoboard, folded paper);
- describing characteristics of shapes (for example, a triangle has three straight sides);

- understanding that two triangles, even if they are oriented differently in space, are still triangles;
- recognizing that equilateral triangles, triangles with sides of different lengths, triangles with oblique angles, and triangles with right angles are all triangles;
- putting shape blocks together to form new shapes (for example, two squares can make a rectangle);
- discussing how squares and rectangles are alike and different;
- creating 2- or 3-dimensional shapes with toothpicks and marshmallows;
- identifying and labeling shapes and parts of shapes found in the environment.

2 Shows understanding of and uses direction, location, and positional words.

(Content Standard VIII)

Children learn positional vocabulary as they develop spatial awareness and a recognition of symmetry and balance. Through discovery, experimentation, and experience, children form beginning understandings of direction (Which way?), distance (How far?), and location in space (Where?). Children show their understanding by:

- placing an object inside and outside, behind and in front, under and above, beside and on a box, and describing its changing locations;
- commenting that an object is nearer to me and farther from you;
- identifying who is sitting beside the teacher and who is sitting in front of her;
- completing an obstacle course that asks the runner to crawl through the tunnel, run behind the swings, run in front of the slide, jump beside the sandbox, and squat on the ramp;
- giving directions to a partner in the block area to place the curved block on top of the long rectangle block;
- using direction, location, and position words spontaneously as they participate in play activities.

E Measurement

1 Orders, compares and describes objects according to size, length, capacity, and weight.

(Content Standard V)

Kindergarten students are very interested in ordering and comparing objects (for example, "You have more ice cream than I do."). They start by being able to order only four or five objects, and gradually increase to eight or ten. Many children begin to differentiate among size, length, and weight and use appropriate terms to describe each attribute. These direct comparisons of length, volume, temperature, and weight form the foundation for more complex measuring activities. Other examples include:

- arranging three or four rods or towers from shortest to longest from left to right;
- making a display of several stones, arranged from smallest to largest or largest to smallest;
- commenting that the outside door is heavier than the classroom door;
- saying one child's bucket holds more sand than another's;
- noticing that one child is taller than another;
- describing the temperature of her popsicle as colder than that of her juice;
- using measurement words in the block corner, at the sand table, or when exploring with unifix cubes.

2 Estimates and measures using non-standard units.

(Content Standard V)

When children begin to measure objects, they first select a unit of measurement, compare that unit to the object, and count the number of units required to represent the object. Kindergartners spontaneously use such units as a foot, hand span, paper clip, or block to measure objects. They explore estimation with length, size, and volume, and show they are learning to estimate and measure by:

- guessing whether or not a container is big enough to hold all their marbles;
- measuring the length of a table by connecting cubes;
- estimating that a bird's nest weighs the same as five counting bears;
- stating that the road they just built is seven unit blocks long;
- using a common measuring unit to determine how long or tall things are.

3 Explores common instruments for measuring during work or play.

(Content Standard V)

Children are interested in the tools and instruments used by adults, although they are just beginning to explore conventional measurement tools. They are interested in trying measurement tools to see how they work and will often incorporate them in their play. Examples include:

- using a balance scale when comparing the weights of objects;
- incorporating measuring tools into their dramatic play (for example, "We need a cup of flour for these pancakes.");
- asking for a yardstick so they can see if their block building is taller than the yardstick;
- using a ruler to compare the height of a plant;
- using measuring cups at the water table to measure water or tablespoons and teaspoons at the cooking table to add ingredients to the cookie recipe;
- using classroom measurement tools (scales, rulers, cups) for activities such as cooking, building, and describing items at the science center.

4 Shows awareness of time concepts.

(Content Standard V)

Initially, kindergarten age children view time as a sequence of events of varied durations (eating breakfast comes before the bus ride to school and takes less time). Through experiences with classroom routines, schedules, clocks, and calendars, they *begin* to use words representing time (such as: "morning," "afternoon," "evening," "day," "night," "yesterday," "tomorrow," "week," "month"), name the days of the week, and refer to time in more conceptual terms. Children demonstrate time-awareness by:

- talking about the trip taken when "I went to school the day before this one";
- commenting that planting the seeds took *all* of free-choice time;
- knowing that the bus driver will come to pick them up *after* they play outside;
- labeling times of the day as morning or night time;
- asking a question about clocks or what time it is;
- telling a friend, "April is when my birthday comes and I will be six years old";
- discussing with a classmate the characteristics of a season (for example, "It's cold in winter." or "In summer we can go swimming.");
- beginning to use appropriate words related to time and sequence in conversation.

F Data analysis and probability

1 Begins to collect data and make records using lists or graphs.

(Content Standard IX)

Collecting data, graphing, and interpreting graphs provide meaningful opportunities to count and make comparisons. Initially, kindergartners are more interested in specific instances of data and lists ("Terry lives in a house and I live in an apartment.") than in classifying data into categories (10 children live in apartments, 8 live in houses, and 4 live in mobile homes). With teacher guidance, they can pose questions, collect data, and organize their observations using concrete objects, pictures, graphs, and lists.

- studying the list of who liked red apples and who liked the green apples best;
- looking at the graph that shows different ways children get to school and counting to find out that seven children take the bus and six are walkers (or that *more* children take the bus than are walkers);

- creating a classroom graph of daily weather conditions (for example, cloudy, rainy, sunny or snowy) and discussing results;
- designing a survey using "Kid Pins" (clothes pins with student name) and collecting data from classmates.

I Personal and Social Development

This domain has a dual focus. First, it refers to children's feelings about themselves. The teacher can learn about these feelings by observing children, listening to their comments, and hearing families talk about their children. Included in this focus are indicators that refer to children's views of themselves as learners, and their sense of responsibility to themselves and others. The second focus concerns their social development, including children's interactions with peers, adults, and family members. Particularly important are the skills children show they are acquiring while making friends, solving conflicts, and functioning effectively in groups.

A Self-concept

1 Shows comfort and confidence with self.

First graders are still eager to please adults and often depend on praise to feel competent. Acquiring self-awareness and confidence is a gradual process that occurs through children's interactions with others and repeated experiences of being effective. Examples of how first graders demonstrate comfort and confidence include:

- easily choosing a work or play partner (for example, during a choice time, or outdoor play);
- working or playing alone or with a friend without needing frequent adult support or approval;
- explaining their disability to a new child in the classroom;
- coping reasonably well when things don't work out exactly as planned (for example, trying to draw a picture of someone and not having it look exactly right).

2 Shows initiative and self-direction in actions.

First grade children want to try new things, but often overestimate their capabilities. Examples of how they demonstrate initiative and self-direction include:

- thinking up a project and working on it without extensive teacher direction;
- helping with extra clean-up responsibilities in the classroom;
- transporting personal belongings to and from school (for example, homework, backpack, notes to family members);
- volunteering help to a peer having difficulty coming up with a story idea;
- explaining to someone the kind of help they need to play a game (for example, "Put the game on the tray of my wheelchair so I can reach it.").

B Self-control

1 Follows classroom rules and routines.

Children at this age follow rules and routines best when they have helped shape them and when rules are simple and consistent. Like kindergartners, they can be quite dogmatic with their peers, insisting on adherence to rules that even they may sometimes forget. Although they are likely to need adult encouragement and reminders, some ways that first grade children demonstrate the ability to follow rules and routines are:

- locating and replacing personal belongings and classroom supplies;
- taking turns in group discussions;
- arriving in the morning and knowing what to do to begin the day's activities;
- knowing the daily schedule without continually asking "What's happening next?"

2 **Uses classroom materials purposefully and respectfully.**

First grade children are learning to care for the property of others. After they have received direction on how to use materials appropriately, it is reasonable to expect they can do so with few reminders. Examples include:

- using markers, crayons, and scissors, and returning them to supply shelves or baskets when finished;
- finding and using the appropriate materials with intention (locating a magnifier to look more closely at butterfly wings or getting a bucket of unifix cubes to solve a math problem);
- assisting others with clean-up after finishing one's own.

3 **Manages transitions and adapts to changes in routine.**

First graders rely on the predictability of routines. Adapting to or accepting change is often difficult for them. With adult support they can begin to handle change and recognize that different situations call for different behaviors. Some ways children demonstrate the ability to manage transitions and be flexible in behavior include:

- moving from one activity to another with minimal teacher guidance (for example, putting away journals and coming to a class meeting);
- leaving an unfinished task to complete at another time (for example, setting their journals aside and returning to them after lunch);
- hearing that gym time has been canceled and accepting that classroom game time will replace it.

C Approach to learning

1 **Shows eagerness and curiosity as a learner.**

Because first graders learn from direct experience, they are most likely to show interest and curiosity as learners in the context of active tasks. They demonstrate interest and curiosity in different ways, depending on their individual learning styles. Some children express themselves through art, construction, music, or dramatics, while others use words. Ways that they show eagerness to learn include:

- seeking more specific information about a subject (looking in the class library for books about insects after going on a science walk to collect small creatures);
- making puppets based on a story read by the teacher and carefully working to capture the details of each character;
- contributing an anecdote to a class discussion based on something learned earlier;
- replicating at home an activity experienced in the classroom (for example, repeating a science experiment).

2 **Begins to make independent choices of materials, activities, and work/play partners.**

First graders may have preferences about what they like to do, and how and with whom they want to do it. When given the opportunity to make choices in the classroom, six year olds can make some independent choices of familiar as well as unfamiliar activities and experiences. Examples of how first graders demonstrate their ability to make choices include:

- deciding what to write about during writing workshop;

• making an independent choice of material from the math shelf to help solve a problem;

• participating in a newly introduced classroom or recess activity;

• deciding to work on a second choice of activity during choice time because others have already selected their first choice.

3 **Approaches tasks with flexibility and inventiveness.**

First graders who are flexible and inventive can tackle problems with an open mind, try several different approaches, and seek help when they are stuck. Sometimes, inventiveness is expressed through imaginative play. Examples of how first graders demonstrate their flexibility and inventiveness include:

• using materials in new ways (using unifix cubes as weight units on a balance scale);

• building a structure with blocks or Legos and then using it for dramatic play;

• mixing paint to come up with greater color variety;

• bringing color cubes from the math shelves into the block area to use as floor tiles in a building.

4 **Sustains attention to work over a period of time.**

First grade children tend to begin more projects and activities than they complete. They will more readily persist with projects that especially interest them. Examples of how they demonstrate their ability to sustain interest over time include:

• returning repeatedly to the math center to work with tangrams in an effort to create a square;

• choosing to work on a jigsaw puzzle for several consecutive days;

• putting away a story and returning to work on it the next day;

• going to the library repeatedly to get books related to the class's study of animals.

D Interaction with others

1 **Interacts easily with peers when playing or working cooperatively.**

Children want to socialize with peers but often lack the skills to do so effectively. They often need adult guidance and support. Examples of a first grade child's ease with interactions include:

• readily sitting with a group of children at the lunch or snack table;

• giving and receiving peer assistance during work times (for example, helping someone figure out the spelling of a word);

• suggesting that someone join a group in order to share the markers;

• working cooperatively with several children on a math task structured by the teacher.

2 **Interacts easily with familiar adults.**

In first grade, children are beginning to change their relationships with adults. They are working toward greater independence, but they want adults close by for approval and support. They demonstrate skills in this area by:

• bringing their homework to the teacher and soliciting an opinion;

• telling the teacher about yesterday's family expedition;

• responding appropriately to greetings from teachers or other adults when arriving in the morning;

• participating in informal conversations with adults during snack time or lunch.

3 **Participates in the group life of the class.**

First graders are beginning to identify with groups as well as understand how groups function. They are gradually learning to take turns, share, and listen to others. At this age children begin to understand why groups need rules. Examples of how they demonstrate the ability to participate in groups are:

- listening and participating at a school assembly;
- listening to classmates' ideas during group discussions;
- making contributions to group efforts, such as making props for a class play;
- completing classroom jobs without being reminded.

4 **Plays cooperatively in group games.**

First grade children tend to be competitive. However, while they may invent their own rules for games, want to be first, and even expect to win, they are often very concerned about fairness. They learn the skills of cooperative game playing best with games that do not involve winning and losing. Examples of how first graders demonstrate skills in this area include:

- tolerating that they will have to wait for a turn in guessing games that involve the whole class (for example, "I am thinking of a number");
- while playing a board game, watching other players take their turns instead of roaming around the classroom;
- taking turns fairly in games with two or three players;
- participating in games with rules that involve winning and losing (bingo, Connect Four, checkers) with one or two other players.

5 **Shows empathy and caring for others.**

Some children naturally show caring and empathy for others while others need adult and peer guidance to acquire these qualities. Many first graders are quite egocentric and, therefore, it is difficult for them to consider other viewpoints. Examples of how they show empathy and caring include:

- staying inside at recess to keep an injured friend company;
- helping a peer rebuild a block structure that was knocked down;
- expressing concern for someone experiencing a problem (the death of a pet, a newcomer trying to adapt to the class).

E Social problem-solving

1 **Uses simple strategies to make social decisions and solve problems.**

Learning how to make constructive social decisions and resolve differences of opinion is an important and challenging task for children and requires extensive modeling and guidance from adults. For six year olds, using words to resolve conflicts and knowing when to ask for help (rather than reacting impulsively) is an indication of a child's developing skills. Examples include:

- negotiating with another child, using words to express personal feelings;
- listening to another point of view and considering ways to compromise;
- discussing with two other children how to include a new member in their game;
- seeking teacher assistance when game participants cannot agree on the rules;

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- dealing with feelings of anger by using the words suggested by an adult;
- seeking teacher advice about a problem with a friend and then using the strategy the teacher suggests;
- negotiating who will be first in line for the water fountain without being aggressive.

II English Language Arts

This domain organizes the language and literacy skills needed to understand and convey meaning into four components: Listening, Speaking, Reading, and Writing. Students acquire proficiency in this domain through extensive experience with language, print, and literature in a variety of contexts. Over time students learn to construct meaning, make connections to their own lives, and gradually begin to critically analyze and interpret what they hear, observe, and read. They begin to communicate effectively orally and in writing for different audiences and purposes.

A Listening

1 Gains meaning by listening.

(Content Standards II, III, and IV)

By listening, observing, and analyzing information critically, children gain understanding of the world around them. First graders are increasingly able to listen to stories read aloud, gain information, and listen to directions and rules. They can listen for pleasure, information and social interaction one-on one, as well as in small or large groups. They can often sit for extended periods of time listening to a "good" story or presentation, but may squirm and fidget if asked to attend to something that does not immediately capture their interest. Children demonstrate this ability by:

- listening to a story and retelling it or relating it to a personal experience;
- listening to a book read aloud and asking or answering relevant questions;
- focusing attention on a speaker and demonstrating attentiveness as a listener through body language or facial expression;
- listening to music and describing a response to it.

2 Follows multi-step directions.

(Content Standards II, III, and IV)

First graders can understand and follow three- to-four step oral directions. Children show they are learning this skill by:

- listening to someone give a series of three- or four-step directions or instructions and following them without reminders;
- helping a classmate who did not hear or understand the directions by carefully repeating them.

B Speaking

1 Speaks clearly and conveys ideas effectively.

(Content Standard I)

When given numerous opportunities for exploratory conversations and discussions, most first graders can speak so others can understand them, adjusting volume and expression appropriately. They apply social conventions of language by taking turns, speaking in a group and attempting to stay focused on a topic. With encouragement from a teacher, they can express ideas in complete sentences using simple and accurate syntax. Other ways they show this ability are by:

- initiating conversation, and using appropriate words and voice level;
- following rules for conversation and contributing relevant ideas to a small group discussion;
- expressing ideas orally in complete sentences;
- telling and retelling stories and events in logical order;
- speaking clearly and audibly with appropriate expression in front of a group;
- using a prop to support an oral message.

2 Uses oral language for a variety of purposes and audiences.

(Content Standard I)

As first graders expand their vocabularies, they are becoming increasingly comfortable expressing themselves in different situations and for different purposes.

Most first graders will offer explanations, ask questions to get more information, and share knowledge, ideas, and opinions. They are beginning to recognize the difference between a question and a comment. Socially, they use language to greet others, make their needs known, talk with peers and adults, and invite others to join a group. Creatively, they use language to try to make up rhymes, tell jokes and riddles, sing, and use expression when dramatizing a story Other examples include:.

- trying new vocabulary when speaking;
- using descriptive vocabulary to report what was observed in an activity;
- asking for clarification and explanation of new words and ideas;
- asking appropriate questions during a class discussion;
- using language to express and support an opinion;
- using language to tell jokes and riddles, sing a song, or dramatize a story.

C Reading

1 Shows interest in books and reading.

(Content Standards II and IV)

Appreciating books and reading helps children become life-long readers. A wide variety of reading-related activities in the classroom provides first graders with meaningful opportunities to cultivate an interest and enthusiasm for reading and to practice their emerging skills. At this age, children's interest in books and print sometimes exceeds their reading abilities. Children show their interest by:

- bringing a book in from home and asking the teacher to read it aloud to the class;
- making appropriate comments about and looking for a book after it has been read aloud to the whole class;
- searching for other books by the same author or topic in the class library;
- relating personal experiences to those depicted in the text;
- reading stories, poems, passages or messages, signs, and other forms of print in the environment;
- choosing to read during free time.

2 Shows understanding about concepts of print.

(Content Standard II)

To become successful readers, first graders need basic knowledge about print and books, including how print is organized (from left to right and top to bottom) and the parts of books (front cover, title page, author, and illustrator). When looking at print, they can differentiate between letters, words, and sentences and recognize some basic punctuation marks. They know that writing is used for different purposes, and demonstrate their understanding of concepts of print by:

- reading from left to right and top to bottom;
- making predictions about how to read a word based on a picture on a page;
- using pictures to figure out unfamiliar letters, words, and sentences in books or on signs and other printed matter;
- recognizing the title, author, and illustrator on the front cover of the book;
- bringing a book in from home and "reading" it to the teacher.

3 Demonstrates phonemic awareness.

(Content Standard II)

Phonemic awareness refers to the ability to hear, think about, and manipulate the sounds in words. First graders who become successful readers can hear the smallest units of sound within words (phonemes), recognize sound segments (letter clusters, syllables), and know that words are made up of sequences of sounds. They demonstrate this awareness by:

- telling if a word sounds like another word in some way (starts the same, ends the same, or rhymes);
- counting the number of syllables in a word;
- adding or deleting sounds in spoken words to make new words (for example, removing

the "s" from "stop" to make the new word "top";
- noticing the rhyming pattern in a story the teacher reads aloud;
- blending sounds to make words;
- segmenting sounds in words.

4 Decodes unfamiliar words.

(Content Standard II)

By the end of year, first graders know the sounds made by each letter of the alphabet and use letter-sound correspondence to sound out unknown words when reading (phonics). With single syllable words, most children this age can distinguish initial, medial, and final sounds; long and short vowel sounds; and blends and digraphs. With encouragement, they can figure out unfamiliar words by examining their structures. Examples include:
- blending sounds to recognize and read words;
- figuring out a compound word by identifying the two smaller words;
- reading words by examining their structure (for example, recognizing familiar clusters of letters, prefixes and suffixes, or patterns in words).

5 Uses strategies to construct meaning from print.

(Content Standard II)

Readers rely on many different strategies to help them make sense of text. With guidance from teachers, first graders learn to look for cues related to meaning, language structure, and visual information, such as sight vocabulary, to help them understand what they read. They are beginning to monitor themselves as they read to be sure that what they have read makes sense, and they attempt to self-correct when it does not. Strategies they use include:
- using pictures to figure out unfamiliar letters, words, and sentences in books or on signs and other printed matter;
- using knowledge of the story and topic and other contextual cues to read words (for example, knowing the story is about insects, looking at a picture, knowing the "m" sound, and guessing "mosquito" correctly);
- using the context of the sentence as a whole to self-correct an error;
- reading a sentence and then rereading it with the appropriate inflection after seeing the ending punctuation;
- recognizing common and irregularly spelled words by sight;
- understanding that different texts require different strategies.

6 Comprehends and interprets fiction and non-fiction text.

(Content Standards II and IV)

As first graders listen to or read text, they can be encouraged to gain an initial understanding, develop an interpretation, extend or critically evaluate text, and personally reflect and respond to it. Ways children demonstrate growing comprehension include:
- predicting and justifying what will happen next in a story;
- identifying theme or main ideas, characters and setting, and different times, places, and customs reflected in what was read;
- distinguishing between fiction and non-fiction and reality and fantasy;
- recognizing cause and effect;
- asking and answering orally or in writing basic comprehension questions about what was read;
- brainstorming or webbing why they like a story;
- comparing information within and between texts;
- making connections between themselves and what has been read in the text;
- making mental images from what has been read and creating drawings of them.

D Writing

1 Uses writing strategies to generate ideas and convey a message.

(Content Standard I)

First graders benefit from having many opportunities to write throughout the day. They begin

to demonstrate understanding of the first step of the writing process as they generate ideas and make simple plans for writing. They develop main ideas that are supported with some detail and description and begin to organize their writing in a sequence including a beginning, middle, and end. Other examples include:

- using talking, drawing, or a graphic organizer before writing;
- hearing a story and using it as the basis for writing;
- drawing on personal experiences to generate ideas for writing;
- writing a draft focused on a single topic.

2 Writes for different purposes and audiences.

(Content Standard I)

By the end of first grade, many children can write to describe events, provide information, express opinions, persuade others, tell stories, and respond to literature. When provided with numerous opportunities to write for different purposes, many first graders have a beginning understanding that they are writing for an audience and that the purpose of their writing affects organization and content. Children show this ability by:

- retelling a story by drawing a series of pictures and then writing one sentence captions for each picture;
- making lists and signs for projects and activities throughout the classroom;
- using the Internet to send an e-mail to a friend;
- writing a recipe with specific step-by-step directions explaining how to make something;
- writing an opinion supported by details;
- writing a personal narrative;
- using a learning log or personal journal.

3 Recognizes and uses basic conventions of print.

(Content Standard I)

First graders can recognize and use some mechanical and grammatical conventions of writing, including left-to-right, spacing between words, upper case letters for the first word in a sentence, names of people, "I", days of the week and months of the year, and periods and question marks. Children this age can write in complete sentences that include a subject, verb, and object. Their writing may include errors in spelling, grammar and mechanics as long as they do not interfere with the meaning of the work. Other examples include:

- using upper- and lower-case letters correctly when writing;
- using ending punctuation correctly;
- writing correctly structured sentences;
- printing legibly, forming letters correctly, and leaving space between words and sentences.

4 Uses strategies to create invented and conventional spellings.

(Content Standard I)

Using invented or temporary spelling is one way that first graders demonstrate their understanding of how to blend letters into words. When children have extensive opportunities to use writing purposefully in the classroom, they begin to approximate conventional spellings more closely. With encouragement from teachers, first graders can spell correctly three- and four-letter short vowel words, words they studied previously, and words that follow consistent spelling patterns. Children show they are growing in this skill by:

- using initial consonants and letter-sound correspondence to spell, and attempting to use closer approximations of conventional spellings;
- using resources from their environment (chart, books, picture dictionaries, word wall) to help with spelling;
- recognizing the difference between invented spellings and conventional spellings in their own writing;
- using conventional spellings of high frequency words.

5 Reviews, confers, and makes simple changes in writing

(Content Standard I)

With encouragement to re-read

their own writing, first graders may realize they have misspelled a familiar word or omitted periods, capitals, or an important detail. They like to share their writing with a friend or with the class, and after some prompting from a teacher or peer, can make a simple change in their writing. Children demonstrate this ability by:

- re-reading a story, deciding there is a missing detail, and adding it;
- re-reading a story and recognizing that a sentence doesn't make sense;
- editing for punctuation and capitalization and spelling of familiar words;
- sharing writing with a peer or teacher and making changes to writing.

III Mathematics

The focus in this domain is on children's approaches to mathematical thinking and problem-solving. Emphasis is placed on how students acquire and use strategies to perceive, understand, and solve mathematical problems. Mathematics is about patterns and relationships, and about seeking multiple solutions to problems. In this domain, the content of mathematics (concepts and procedures) is stressed, but the larger context of understanding and application (knowing and doing) is also of great importance.

A Mathematical processes

1 Applies concepts and strategies to solve mathematical problems.

(Content Standards I, II, III, and IV)

First graders can begin to set up a problem, determine the tools and materials needed to solve it, and apply strategies (such as trial and error, looking for a pattern, making a drawing, "counting on" or backwards, or counting in groups) to find solutions. When asked, they can discuss the effectiveness of their strategies and explain their reasoning. Examples include:

- using trial and error to figure out how many unifix cubes it takes to balance a scale;
- figuring out how many additional books are needed for the class if there are only 12 books and 21 children in the class;
- using objects to find multiple ways to make ten (for example, 1+9, 5+5, etc.);
- using a drawing to find the total number of wheels on 3 bicycles and 2 cars;
- figuring out the number of dogs and people given the number of heads and legs;
- counting by fives using tally marks to determine the favorite name for the class pet;
- using unifix cubes in sets of ten and "counting on" to determine the total number of children in all of the first grades.

2 Communicates and represents mathematical thinking.

(Content Standards I, II, III, and IV)

Discussion, representation, reading, and writing are essential mathematical thinking. First graders can explain their reasoning, clarify their ideas, and represent their own thinking using words and pictures. They show their growing abilities by:

- sorting a group of objects and then explaining the sorting rule;
- justifying their reasoning for solving a problem by applying a strategy used to solve a similar problem;
- drawing a picture to represent and model a problem or situation, solving it, and then explaining the process;
- reading a simple word problem, interpreting it, and writing a number sentence to find the solution;
- listening to a peer's explanation of how a problem was solved and suggesting an alternate approach;
- using stick-on notes for "kid pins" or even construction paper to represent data from a class survey on "How We Go to School";
- using mathematical terms to describe a situation accurately (for example, "more," "not as much," or "about the same" to describe quantities).

B Numbers and operations

1 Shows understanding of number and quantity.

(Content Standards V and VI)

First graders can count, read, model, and write whole numbers to 100 or more. It is essential that first graders understand that numbers can be represented in many ways (for example, 10, ten, two sets of five stars). Their understanding of number includes knowing the value of coins and

understanding and representing unit fractions (½). Other examples include:

- looking at a set of 6 objects arranged in ten frame and instantly recognizing it as six;
- recognizing equivalent forms of the same number (for example, recognizing that 30 is the same quantity if it is 30 horses or 10+10+10 candies or 15+15 red dots);
- counting the number of objects in a group and writing the correct numeral to describe the set (for example, writing the numeral 30 to match 30 cubes);
- counting accurately in different ways to 100 (for example, by 2s, 5s, and 10s);
- recording the numerals to 100 accurately (for example, recording the score in a game, writing numbers on a calendar);
- solving a problem that involves sharing candies three ways;
- identifying the value of a penny, nickel, dime, quarter, and dollar;
- identifying equal parts of a whole and equal parts of a set using halves.

2 Shows understanding of relationships among quantities.

(Content Standards V and VI)

First graders' understanding of quantity includes comparing numbers up to 100 and ordering numbers to at least 20. Work with concrete materials (interlocking cubes, popsicle sticks, trading games) helps them to grasp the concept of grouping by tens and place value. They can combine and break apart numbers, identify odd and even numbers, and describe the relative position and magnitude of whole numbers (for example, finding 40 on a number line or 100 chart and explaining that it is 10 less than 50). Children show this ability by:

- comparing two or more sets and determining which is more, less, or equal to describe the comparisons;
- composing or decomposing numbers (5+5=10 and 10=2+3+4+1 or 15+15+2=32 and 32=30+2);
- identifying positions 1st to 20th (for example, when lining up to go outside);
- comparing a quarter to five nickels or two dimes and one nickel or 25 pennies and explaining why they are all equal;
- identifying 1 more or less or 10 more or less than a given number;
- connecting representations of numbers less than 100 (for example, concrete materials, drawings or pictures, mathematical symbols);
- showing whole/part relationships of whole numbers less than 20 (for example, playing with counters in a cup);
- building whole numbers less than 100 using groups of ones and tens;
- demonstrating an understanding of order relations for whole numbers less than 100 (for example, placing numbers on a 100 chart).

3 Uses addition and subtraction to solve problems with one- and two-digit numbers.

(Content Standards V and VI)

First graders combine and separate sets and recognize and use the symbols "+" and "-" in equations. Some strategies used for combining and separating quantities include counting on fingers, doubling, and knowing "number families." As they acquire facility with strategies for finding sums and differences with numbers up to 20, they begin to apply these same strategies with numbers to 100. Ways they show this ability include:

- figuring out sums on number cubes using doubles or doubles + 1 (if 5 + 5 = 10, then 5 + 6 is one more than 10);
- counting on from 10 (for example, given a group of 10 and asked to add 3 more objects, the child counts on from 10 instead of beginning at 1);
- finding the missing number in addition and subtraction number sentences when the missing number is 10 or less;

- using manipulatives and/or paper and pencil (drawing or algorithm) to find an answer;
- developing, using, and explaining strategies to add and subtract single-digit and two-digit whole numbers and to add 3 single-digit addends;
- selecting appropriate methods of calculation from among manipulatives, mental math, paper and pencil, calculators, or computers;
- representing mathematical concepts with symbols for addition, subtraction, and equals.

4 Makes reasonable estimates of quantities and checks for accuracy.

(Content Standards V and VI)

Through estimation activities, first graders extend their understanding of number. They can make reasonable guesses using numbers or words and phrases such as "same," "almost," "more than," and "less than" with sets to about 100 objects. Children demonstrate estimation ability by:

- looking at a group of objects and deciding if it is more than 10, about 20, or less than 50;
- estimating the number of objects in a group, explaining the reasoning behind the estimate, and then checking the estimate by counting;
- comparing the number of beans in two jars;
- estimating the number of tens and ones blocks used to cover a shape.

C Patterns, relationships, and functions

1 Sorts, classifies and orders objects by one or more attributes.

(Content Standards VII and X)

First graders can sort, classify, and order objects by one or more attributes, such as size, shape, color, function, number. They can describe their sorting rules and compare objects for similarities and differences. Examples include:

- sorting a collection of keys into two groups: those with ridges on one side and those with ridges on both sides;
- describing similarities and differences among the shapes and sizes of seeds;
- comparing objects within a collection and putting the objects in order by size (for example, small to large, long to short);
- using sorting and classifying in social studies or science activities (with a set of solids, first sorting them by shape, putting the set together again, and then sorting by color);
- sorting a collection of objects according to their own sorting rule and having a partner guess the rule;
- sorting attribute blocks by both color and thickness, i.e., red, thick squares vs. yellow, thin squares.

2 Makes, copies, and extends patterns.

(Content Standards VII and X)

Patterns are a critical part of mathematical thinking. First grade children can identify the unit of pattern (AAB, □ +2); create and extend patterns concretely, symbolically, and numerically; and describe and analyze them. They can recognize patterns in the environment, in literature, and with numbers. With encouragement, they can begin to use patterns to make predictions. Children show they are learning this skill by:

- making, copying, and extending a pattern with their voice, body, and musical instruments;
- identifying the rule needed to extend a pattern or determine a missing element in a pattern (for example, □ + 3 = Δ; jump, hop, step, ___, hop, step);
- transferring a pattern from one medium to another (for example, making an AAB pattern with color cubes and then clapping the pattern);
- recognizing a pattern in a book and making a prediction about what will come next;
- creating a number pattern and explaining the rule;

- recognizing patterns on objects in the classroom (for example, the grid on the radiator or the tiles on the floor) or outdoors (the veins on leaves, the bricks on a path).

D Geometry and spatial relations

1 Recognizes attributes of shapes and relationships among shapes.

(Content Standard VIII)

First graders can recognize, name, build, draw, and describe the defining attributes of 2-D shapes, including triangles, rectangles, squares, and circles. They can identify relationships between shapes. Many children this age begin to explore 3-D shapes. By constructing and manipulating shapes, they develop spatial thinking. Other ways they show this ability include:

- comparing, matching, and reproducing shapes (for example, with tangrams, geoboards, pattern blocks);
- recognizing the relationships between shapes (for example, combining two triangles to create a square, or two trapezoids to form a hexagon);
- describing the defining attributes of shapes (for example, triangles have 3 corners, 3 sides);
- recognizing and comparing specific attributes of forms and shapes (number of sides, corners, faces);
- recognizing and naming 2- and 3-D shapes in their environment (for example, identifying the blackboard as a rectangle, a box as a cube, or a ball as a sphere).

2 Explores and solves spatial problems using manipulatives and drawings.

(Content Standard VIII)

First graders reveal their developing sense of order, design, and spatial organization as they create drawings, build with blocks and Legos, and use math manipulatives (such as pattern blocks, tangrams, and geoboards). Hands-on experiences that allow them to move in physical space and arrange and describe objects in space help them learn about location (Where?), distance (How far?), direction (Which way?), and positional vocabulary ("near," "far," "below," "above," "behind," "to the right" or "left of"). Children show this ability by:

- giving or following directions for finding some needed materials using positional words (for example,"I think the pattern blocks are on the shelf below the scales, and maybe on the left side.");
- creating symmetrical designs using squares and triangles;
- describing or drawing a ramp for a block building and then constructing a ramp with a set of triangular blocks;
- creating a pattern block design using symmetry and realizing that it is the same on both sides;
- arranging colored inch cubes in front of a small mirror, looking at both the cubes and their reflections, and then using a new set of cubes to build the combined shape.

E Measurement

1 Compares and describes objects according to length, capacity, and weight.

(Content Standard V)

As first graders measure and describe objects, they can name, discuss, and compare objects according to their attributes. They use comparative words and non-standard units. Examples include:

- identifying the heavier of two objects after weighing them on a balance scale;
- discussing the length and width of an object just measured, using non-standard units;
- comparing objects according to size (for example, "My hair is longer than yours." "This one weighs more.");
- comparing the height of two children by using a length of string.

2 Uses simple tools and techniques to measure with non-standard units.

(Content Standard V)

By exploring measurement with non-standard units, first graders acquire an understanding of the measuring process. They can estimate measurements and solve problems using different non-standard units. They begin to learn the names, purposes, and methods of using tools such as balance scales and thermometers. Children demonstrate this by:

- measuring distance around a desk using non-standard units;
- estimating length, height, or weight using non-standard measures (for example, hands, body lengths, blocks) and then checking predictions;
- using non-standard units to determine length and weight (unifix cubes, one-inch cubes, Cuisenaire rods);
- using non-standard units to estimate, measure, and compare mass/weight;
- recognizing the uses of such standard measuring tools as scales and thermometers.

3 Shows some understanding of time concepts.

(Content Standard V)

First graders are developing an understanding of the sequence of events and the passage of time. They can sequence the days of the week and the months of the year. They can tell time using digital and analog clocks to the nearest hour. Children show understanding of time concepts by:

- measuring and/or describing yesterday, today, tomorrow, and/or before, after;
- being able to name the days the class goes to gym;
- reading and using information on a calendar with some accuracy;
- recognizing repeating patterns of time (days, weeks, and months);
- ordering their day ("I wake up. I go to school . I go home. I go to sleep.");
- looking at the clock and recognizing that in a few minutes it will be 11:00 o'clock.

F Data analysis and probability

1 Collects, records, and interprets data using simple tallies, lists, charts, and graphs.

(Content Standard IX)

First graders recognize that data can be organized according to categories and displayed in different ways. Content across the curriculum provides children with meaningful experiences to learn how to organize and represent data. As they conduct simple surveys and create charts and/or graphs (concrete and/or symbolic), first graders develop the skills of reading, interpreting, and comparing information. Examples include:

- conducting a simple class survey, creating categories, and then representing the data graphically (for example, about favorite foods, number of brothers and sisters);
- tallying collected data on questions such as, "How many children want apples or bananas for snack?";
- creating a concrete graph of "How we get to school" using green unifix cubes for buses, red ones for cars, and yellow ones for walking, or a simple picture graph (pictures of buses, cars, and feet);
- using a graph to answer questions (for example, "Which type of house do the most, the fewest, or equal numbers of students live in?");
- making a chart with different categories to organize data;
- interpreting data by making comparisons (for example, how many more).

2 Begins to make predictions based on collected data.

(Content Standard IX)

First graders can begin to reflect on information and evaluate the likelihood of events or situations. As they make predictions and listen to those of others, they can discuss whether their predictions are reasonable. Ways children show this growing ability are:

- offering an explanation about the likelihood of it snowing and saying, "We live where it

is always warm and it never snows";

- sorting two packages of colored candies and predicting how many reds there will be in a third package;
- recording the outdoor temperature for several days and then making a prediction about the next day's temperature;
- charting how many people in the class prefer apples or bananas and then predicting whether the other first grade classes will have the same results;
- predicting the chance of an event happening (never, sometimes, always).

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